Sauk-Suiattle Amphibian Survey Report 2010

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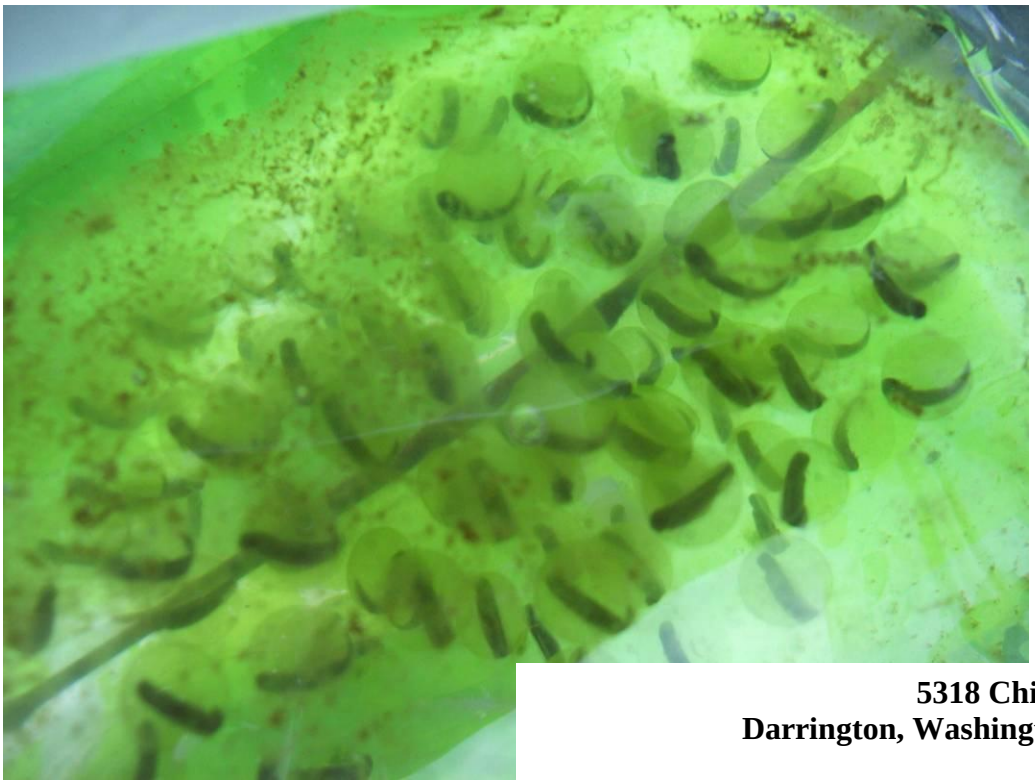

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This report is based on weekly amphibian surveys taken in the spring of 2010 in the Reservation Slough wetland on the east side of the Sauk-Suiattle Indian Reservation. The surveys were done as an update to the Sauk-Suiattle Wetlands Report, written in 2003. Both the original report and this update were supported by grants from the U.S. Environmental Protection Agency.

Survey objectives

The surveys were conducted in support of the Tribe's water quality program with the following objectives in mind:

1) *Assess the annual change in amphibian species and abundance.*

This year's surveys were the fourth of an annual program. Over the years, the surveys could help determine trends of amphibian populations in the lone Class 1 wetland on the 25-acre Sauk-Suiattle Indian Reservation.

2) *Analyze the data to highlight potential water quality or habitat concerns.*

Dips in amphibian numbers or species or unusual numbers of deformities could serve as an additional bellwether to the Tribe's regular water quality monitoring, alerting the Tribe to potential contamination or habitat alteration nearby.

3) *Help expand the regional amphibian database.*

Biologists throughout the Pacific Northwest have been striving for more coordinated regional amphibian monitoring that follows standardized methods. (Olson, Leonard, Bury, 1997) The Sauk-Suiattle Indian Tribe can contribute to those efforts over time by developing and improving this annual amphibian survey.

Description of survey area

The survey area covers 5.5 acres of a roughly 10-acre wetland that follows the course of an oxbow slough of the Sauk River. The survey area is confined to the portion of the wetland owned by the Tribe. Fortunately, that portion contains much of the best pond habitat. This is a Class One wetland, according to the Sauk-Suiattle Indian Tribe Wetlands Report (2003). The National Wetlands Inventory database describes the slough as a Palustrine forested and intermittently flooded area. Aerial photos show this slough was the main channel of the Sauk River in 1949. Sometime soon after, the main channel shifted to the east and has not reoccupied the slough, although channel migration will surely happen here someday again. In previous years, floodwaters from the Sauk entered this channel at above 25,000 c.f.s. at the Sauk River near Sauk gage, which is a flood of roughly two-year occurrence. The slough also receives groundwater and is wet year-round, although water levels fluctuate based on flow connectivity with the main channel, which avulses frequently, sometimes close, other times far from the slough mouth. Beaver, otter and wood ducks are among the many wildlife species here. The dominant plant species are red alder, Reed canary grass and cottonwood.

To the east is a forested upland area that separates the slough from the Sauk River. The upland is mainly hardwoods, including some big leaf maples, but also has some conifers such as western hemlock, western red cedar and Douglas fir in the canopy.

See the aerial photo from 2006 on the next page.

Sauk-Suiattle amphibian survey area (outlined in light blue)

This 5.5 acre area is a Class 1 wetland, formed by relic channels of the Sauk River (at right), last occupied by the mainstem in 1949 or so. The area immediately east of the survey area is a forested upland braided with other relic channels. To the north, beyond Tribal property, the wetland extends and curves back into the Sauk River floodplain. To the west is the Sauk-Suiattle Reservation (loop road with houses).

Summary of survey results

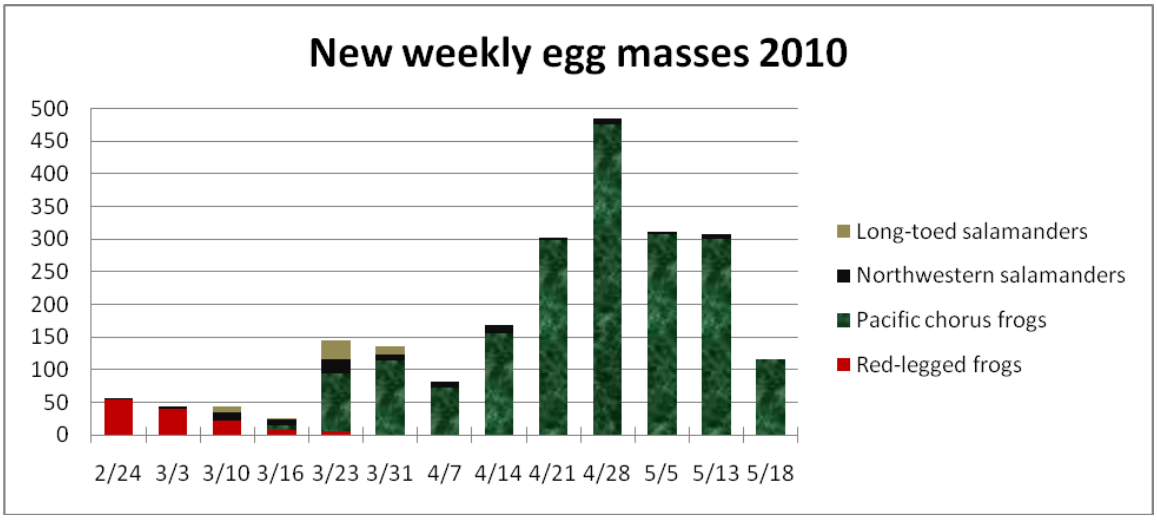
The 2010 survey found more than 1.5 times the number of egg masses as found in 2009. In 2009, surveys found 5 times as many egg masses and twice as many frogs as the average from each of the previous two years. In each year, the egg mass boost was primarily from Pacific chorus frogs, which can lay multiple egg masses per frog annually, (Perrill and Daniel, 1983) so conclusions about population cannot necessarily be drawn from the increase. Red-legged frogs, by contrast, lay only one egg mass per frog annually, (McAllister, Leonard, 2005) but red-legged egg masses did not significantly increase in 2009 or 2010. Northwestern salamanders also lay one mass per year (Thoms, et al., 1997), and those numbers remained steady from 2009 to 2010. (In 2009, the salamander egg masses more than doubled from 2008.)

Reasons for the increase in Pacific chorus frog breeding are unclear. In past years, water levels in the main pond had increased because of a beaver dam, causing the pond to spill and flood the adjacent clearing to a roughly average depth of 18 inches. Habitat expansion seemed one possible explanation. But water levels in the slough were considerably lower during the 2010 survey season (likely because of a more distant main channel of the Sauk providing less winter flood flushes.) Other explanations could be having an experienced crew seeing more chorus frog eggs, or some other natural explanation.

Egg masses

Surveys began Feb. 24 and continued every week, ending May 18, one week earlier than past years. The only exception was the survey on April 21, which spilled over into the next day, April 22, because of an explosion of Pacific chorus frog egg masses that overwhelmed the survey effort. (See Discussion of Results.) By May 18, the survey tallied 2,236 different egg masses from four different species: red-legged frog (*Rana aurora)*, Northwestern salamander (*Ambystoma gracile*), long-toed salamander (*Ambystoma macrodactylum*) and Pacific chorus frog (*Hyla regilla*). The long-toed salamander was a new find in this survey area. It seems possible, even likely, that long-toed salamanders have bred here in previous years, given their similarity to chorus frog egg masses. The Tribe's survey crews have been trained to distinguish the difference, but 2010 was the first year long-toed masses were definitively identified.

Graph 1



The egg mass count in **2008**:

- Red-legged frog:	118
- NW salamander:	43
- Pacific chorus frog:	195
Total:	357

Egg masses in **2009**:

- Red-legged frog:	129
- NW salamander:	104
- Pacific chorus frog:	1,209
Total:	1,442
Unidentified: (probably PCFs)	18

Egg masses in **2010**:

- Red-legged frog:	130
- NW salamander:	107
- Pacific chorus frog:	1,933
- Long-toed salamander:	51
- Unidentified:	15
Total:	2,236

It should be noted that the 2010 survey ended a week earlier than past surveys, and the May 18 survey was cut short, with an estimated 100 or so Pacific chorus frog egg masses left uncounted. They are not included in this total. Numbers were clearly diminishing based on the trend from prior weeks, but this total would surely have risen a bit more if a survey had been conducted the final week of May as usual. Scheduling conflicts did not permit that final survey in 2010.

Kevin Lenon flags a Northwestern salamander egg mass. Photo by Kari Neumeyer, Northwest Indian Fisheries Commission.

Amphibian sightings

We identified 184 frogs using the Visual Encounter Survey technique. This number compares to 240 in 2009, 90 in 2008 and 114 in 2007. The survey intensity was roughly the same each year.

Of those 184 frogs, 30 were red-legged, 146 were Pacific chorus frogs and 8 were unidentified. The mix in 2009 was more evenly distributed between the two species, with 110 red-legged frogs identified. Egg mass numbers for red-legged frogs would seem more reliable as an indicator of abundance, because each female only lays one egg mass. So while the numbers of frogs found in the survey dropped in 2010, the egg mass numbers have remained stable.

The timing of these sightings started earlier. In 2009, only two frogs were identified until April. In 2010, surveys started encountering significant numbers of frogs

by March 10 (and even found one in late February.) By the end of March, 60 frogs had been identified.

Of all these frogs, we saw no deformities.

Pacific chorus frog.
Photo by Kari Neumeyer, NWIFC

Summary of protocols

Protocols are detailed in the Tribe's "Surface Water Quality Monitoring Manual and Standard Operating Procedures." In summary, two to four people spread out through the Tribe's 5.5-acre portion of the wetland, looking for amphibians and their egg masses in a Visual Encounter Survey. Searches focus in particular on the most likely terrestrial habitat, and concentrated efforts were made in and near the wet spots at various depths. Amphibians were tallied by species and age (juvenile or adult). If species could not be determined easily, attempts were made to capture the animal by hand. The amphibian was kept moist while being handled, and released as soon as positively identified.

Egg masses were flagged and given individual numbers to avoid double counting and to assess their development. In past years, this included revisiting each egg mass to track the progress of development, as well as weekly estimates of the percentage of eggs in each mass that appeared dead, but this data collection proved too time-consuming by mid-2009 because of the abundance of Pacific chorus frog egg masses. The data-collection method was modified at that time to simply identify new egg masses without revisiting old ones. Development data was still collected for the new masses.

The data-collection method was further modified in 2010. At first, the old method of tracking weekly development by visiting old egg masses was followed. But by April 7, this once again proved too time-consuming, so data was only collected on new egg masses starting that week. By May 13, because of the super-abundance of Pacific chorus frog eggs, the data-collection method was further modified to only record the flag number and species for the chorus frog egg masses.

For our field identification guides, we used "Amphibians of Oregon, Washington and British Columbia," (1996) by Charlotte C. Corkran and Chris Thoms, and "Amphibians of the Pacific Northwest," (2005) edited by Lawrence L.C. Jones, William P. Leonard and Deanna H. Olson.

Discussion of results

Unlike the previous two years, suitable amphibian breeding habitat receded somewhat in 2010. The mainstem of the Sauk River moved farther away from the mouth of the slough, which probably resulted in lower water levels. The grass next to the main pond had been especially favored by Pacific chorus frogs for breeding in 2008 and 2009,

but the lower water levels visibly constricted the area of breeding habitat in 2010. This did not seem to affect the chorus frogs, however, as surveys in 2010 recorded almost 2,000 egg masses for that species, far more than 2009, when water levels expanded potential breeding habitat.

The dramatic rise in Pacific chorus frog egg masses raises a question: Is the survey crew simply getting better at finding these small masses? The argument in favor would be that all four of the field crew members had worked on this survey at least one year – one had done all four years, two had done three years and the other had worked the 2009 survey. Three had received training from the Washington Department of Fish and Wildlife to identify amphibians and their egg masses, while the other crew member had been trained on the job in 2009, and he proved to be a very meticulous searcher with a good eye. Perhaps the experience had accumulated to make the crew cumulatively better at finding the chorus frog masses.

The argument against this bias would be that the increases in chorus frog egg masses the past two years seem dramatic – far more than one might expect simply from experience. Also arguing against this bias is that surveyor effort has remained similar, especially during the past three years. In fact, the 2010 survey was cut short by one week and tended to average slightly less surveyor hours (measured as number of surveyors times hours surveying) than 2009. Yet the 2010 survey documented an increase of more than 700 chorus frog egg masses than in 2009.

As in 2008, surveying began in late February to try to find egg masses of long-toed salamanders, which typically breed in winter when temperatures are above freezing (Bull, 2005). This can even mean January in some lower elevations, but farther inland in places such as the Sauk River where the winter climate is colder, long-toed salamanders could be expected to breed later than in Puget Sound. (Marc P. Hayes, Washington Dept. of Fish and Wildlife, personal communication.)

In 2010, surveys documented the first positively identified egg masses of long-toed salamanders, throughout most of March, 51 total. Given how much the egg masses of this species resemble eggs from Pacific chorus frogs, the potential exists for surveys from previous years to have misclassified some salamanders eggs as chorus frog masses. To guard against such errors, the surveyors had been trained to recognize the difference and were specifically looking for long-toed masses in previous years, but the possibility still exists, given the similarities.

No Western toads were found in 2010. In four years of surveying, Western toads were only found during the 2008 survey.

Predation is another factor to consider. In 2007, surveys routinely encountered garter snakes, but subsequent years have found less. Similar to 2009, the survey in 2010 found no snakes. Three dead frogs and one dead Northwestern salamander were found – some appeared to be killed by a bird, possibly a heron. The sample size in all of these cases seems too small to draw conclusions.